# SERVICE MANUAL
# & PARTS LIST (without price)

# MIDI GUITAR
# MG-500
# MG-510

AUG.1987

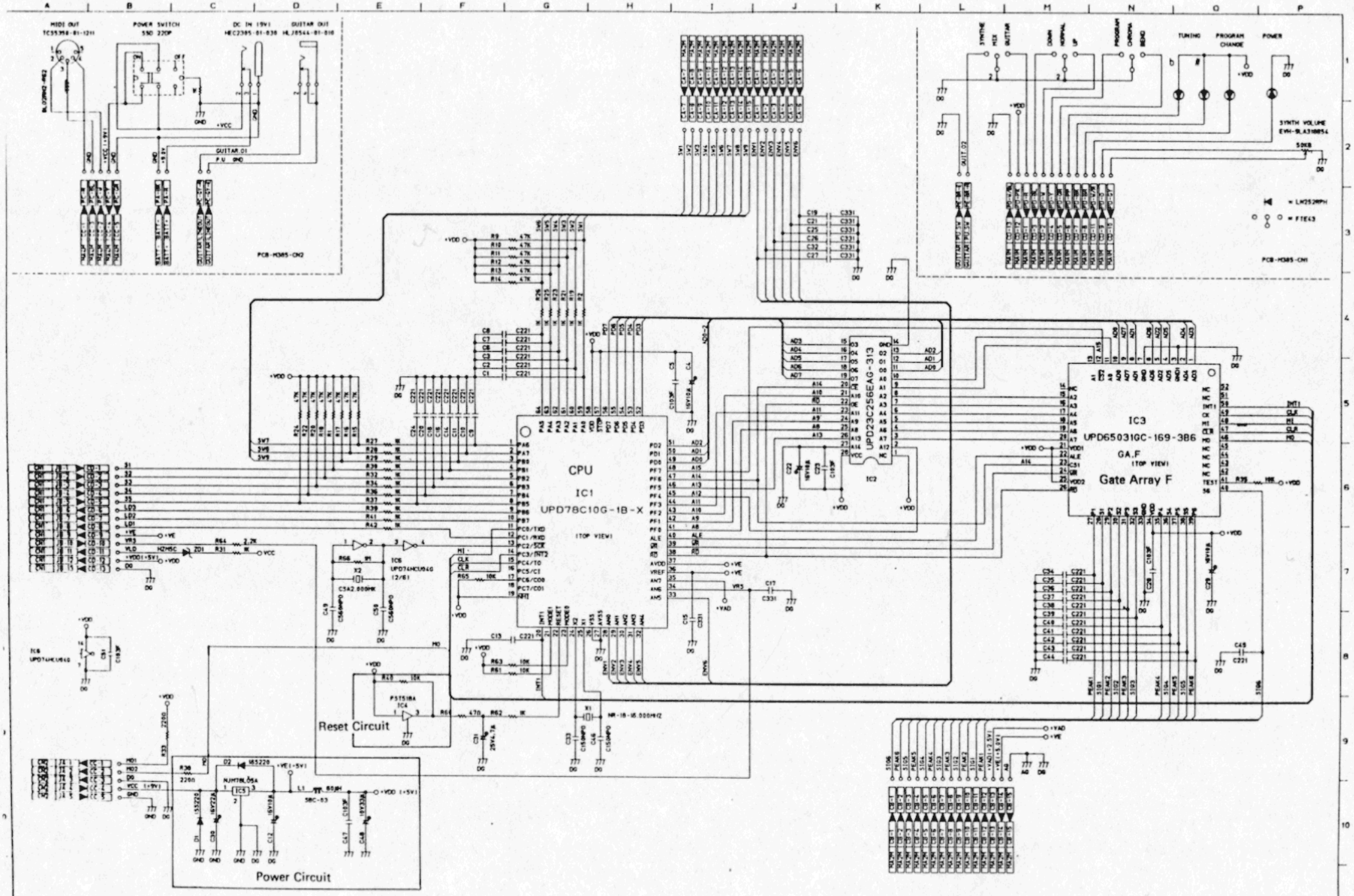
MG-500

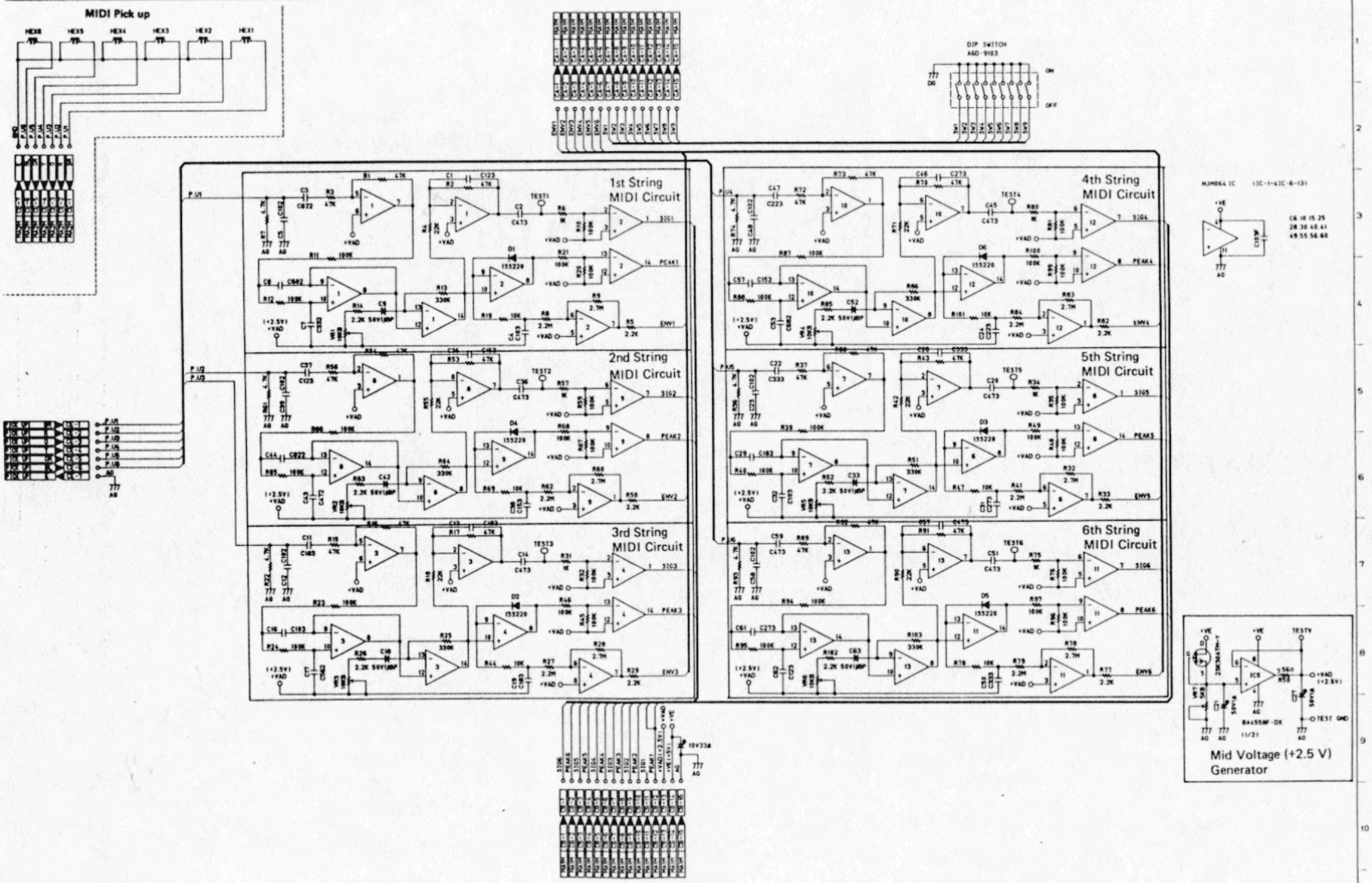
MG-510

CASIO®

CONTENTS

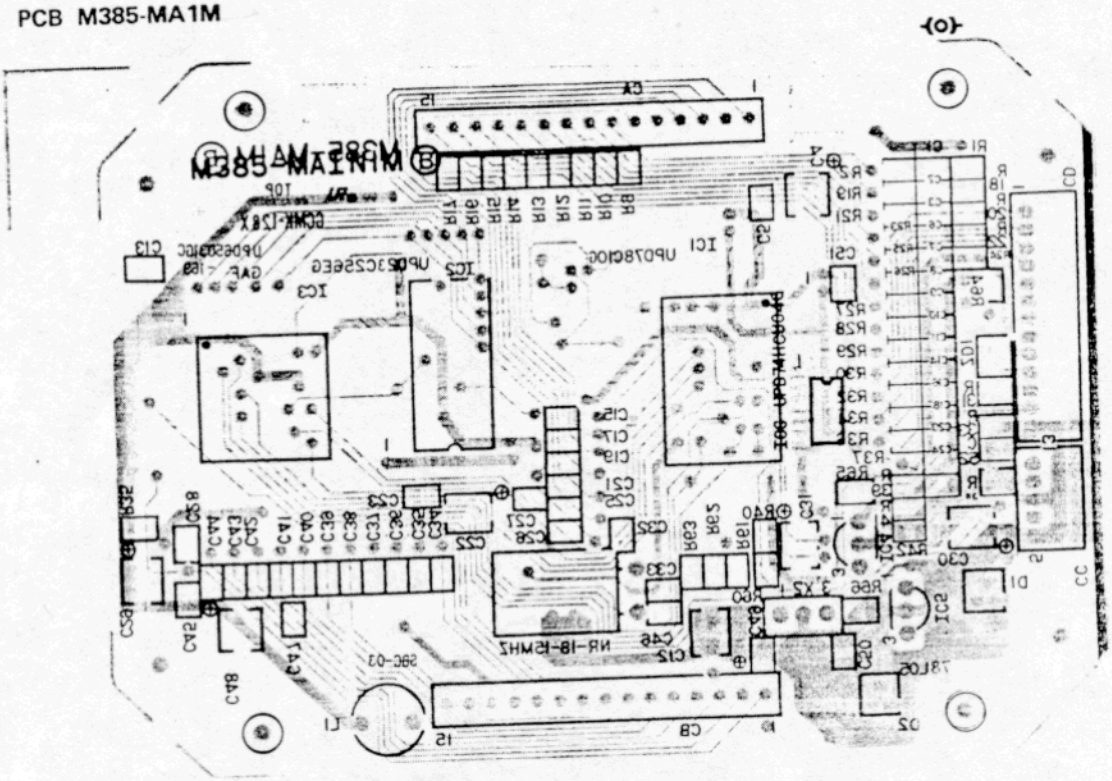

1 SCHEMATIC DIAGRAM ..... 1
1-1 PCBs M385-MA1M, CN1, CN2 ..... 1
1-2 PCB M4385-MA2M ..... 2
2 PCB VIEW ..... 3
2-1 PCB M385-MA1M ..... 3
2-2 PCB M385-MA2M ..... 3
2-3 PART NUMBER REFERENCE TABLE ..... 4
2-4 PCB M385-MA1M ..... 4
2-5 PCB M385-MA2M ..... 6
3 CIRCUIT DESCRIPTION ..... 8
3-1 WIRING DIAGRAM ..... 8
3-2 BLOCK DIAGRAM ..... 9
3-3 CIRCUIT BLOCK ..... 10
4 CPU (μPD78C10G) PIN FUNCTIONS ..... 11
5 GATE ARRAY F ..... 12
6 INTERNAL CIRCUIT OF GATE ARRAY F ..... 14
(1) Frequency Detection Counter ..... 14
(2) Peak Detection Circuit ..... 15
(3) Address Latch ..... 16
(4) MIDI Buffer ..... 16
7 MIDI CIRCUIT ..... 18
8 RESET CIRCUIT ..... 19
9 RELATION BETWEEN FRET PITCH & FREQUENCY ..... 20
10 TEST MODE ..... 21
11 ADJUSTMENTS ..... 22
PARTS LIST ..... 23
EXPLODED VIEW ..... 29
OPERATIONS ..... 30
MIDI Implementation Chart ..... 44


CPU
IC1
UPD78C10G-1B-X
(TOP VIEW)
IC3
UPD65031GC-169-3B6
GA.F
(TOP VIEW)
Gate Array F
IC2
UPD23C256EAG-313
Reset Circuit
Power Circuit
PCB-M385-CN2
PCB-M385-CN1

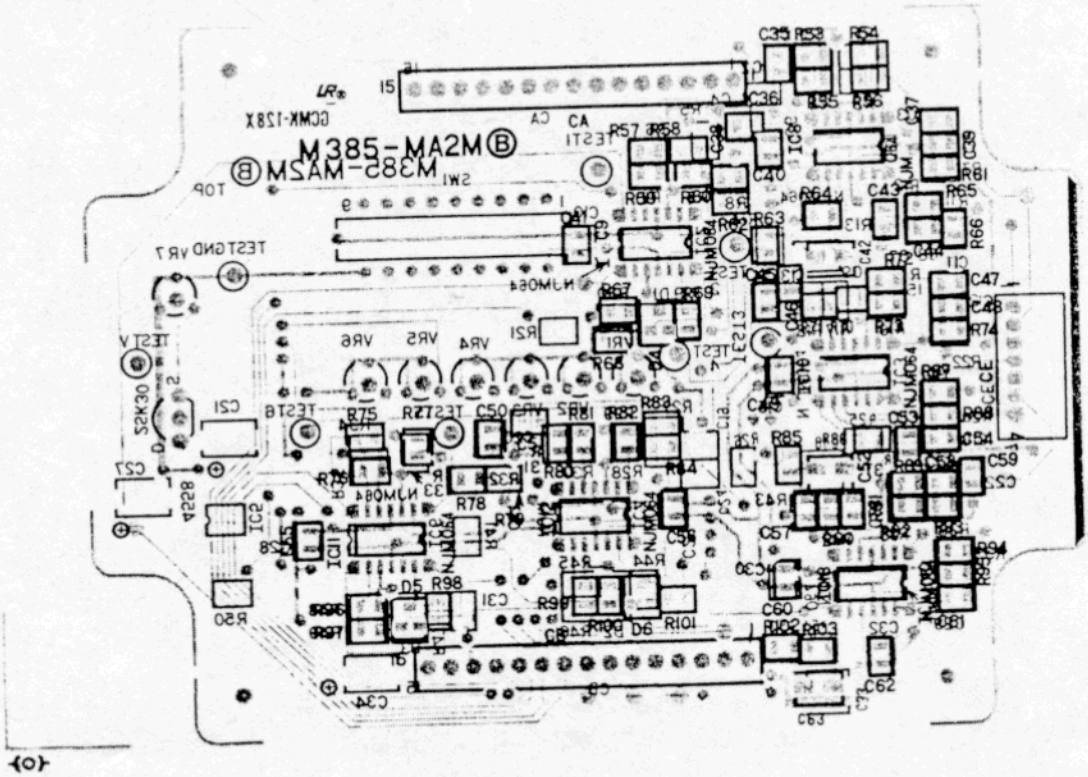

MIDI Pick up
1st String MIDI Circuit
2nd String MIDI Circuit
3rd String MIDI Circuit
4th String MIDI Circuit
5th String MIDI Circuit
6th String MIDI Circuit
DIP SWITCH A60-9103
Mid Voltage (+2.5 V) Generator

## 2 PCB VIEW

### 2-1 PCB M385-MA1M



### 2-2 PCB M385-MA2M



## 2-3 PART NUMBER REFERENCE TABLE

## 2-4 PCB M385-MA1M

### Resistors

| | | | | | |
|---|---|---|---|---|---|
| R1 | 47 KΩ | R25∿R30 | 1 KΩ | R41, R42 | 1 KΩ |
| R2 | 1 KΩ | R31 | 1 KΩ | R43∿R46 | Not used |
| R3∿R8 | Not used | R32 | 1 KΩ | R47∿R59 | Not used |
| R9∿R18 | 47 KΩ | R33 | 220Ω | R60 | 47 Ω |
| R19 | 1 KΩ | R34 | 1 KΩ | R61 | 10 KΩ |
| R20 | 47 KΩ | R35 | 10 KΩ | R62 | 1 KΩ |
| R21 | 1 KΩ | R36, R37 | 1 KΩ | R63 | 10 KΩ |
| R22 | 47 KΩ | R38 | 220Ω | R64 | 2.2 KΩ |
| R23 | 1 KΩ | R39 | 1 KΩ | R65 | 10 KΩ |
| R24 | 47 KΩ | R40 | 10 KΩ | R66 | 1 MΩ |

### LSIs and ICs

| | | | | | |
|---|---|---|---|---|---|
| IC1 | μPD78c10G-1B-X | IC3 | μPD65031GC169 (GA.F) | IC5 | NJM78L05R |
| IC2 | μPD23C256EG- | IC4 | PST518A-2 | IC6 | μPD74HCU04G |

### Capacitors

| | | | | | |
|---|---|---|---|---|---|
| C1∿C3 | 220 pF | C19 | 330 pF | C31 | 25V4.7μ |
| C4 | 16V10μ | C20 | 220 pF | C32 | 330 pF |
| C5 | 0.01μ F | C21 | 330 pF | C33 | 15 pF (Non polarity) |
| C6∿C11 | 220 pF | C22 | 16V10μ | C34∿C45 | 220 pF |
| C12 | 16V10μ | C23 | 0.01 μF | C46 | 15pF (Non polarity) |
| C13, C14 | 220 pF | C24 | 220 pF | C47 | 0.01 μF |
| C15 | 330 pF | C25∿C27 | 330 pF | C48 | 10V33μ |
| C16 | 220 pF | C28 | 0.01 μF | C49, C50 | 56 pF (Non polarity) |
| C17 | 330 pF | C29 | 16V10μ | C51 | 0.01 μF |
| C18 | 220 pF | C30 | 16V22μ | C52 | 100 pF |

**Oscillators**

| | | | |
|---|---|---|---|
| X1 | NR-18-15MHz | X2 | NR-18-2MHz |

**Coil**

| | |
|---|---|
| L1 | SBC-03 |

**Zener Diodes**

| | | | |
|---|---|---|---|
| ZD1 | HZM5C | D1, D2 | ISS220-L |

2-6 PCB M385-MA2M

Resistors

| | | | | | |
|---|---|---|---|---|---|
| R1∿R3 | 47 KΩ | R36 | 4.7 KΩ | R71 | 22 KΩ |
| R4 | 22 KΩ | R37∿R38 | 47 KΩ | R72∿R73 | 47 KΩ |
| R5 | 2.2 KΩ | R39∿R40 | 100 KΩ | R74 | 4.7 KΩ |
| R6 | 1 KΩ | R41 | 2.2 MΩ | R75 | 1 KΩ |
| R7 | 4.7 KΩ | R42 | 22 KΩ | R76 | 100 KΩ |
| R8 | 2.2 MΩ | R43 | 47KΩ | R77 | 2.2 KΩ |
| R9 | 2.7 MΩ | R44 | 10 KΩ | R78 | 2.7 MΩ |
| R10∿R12 | 100 KΩ | R45∿R46 | 100 KΩ | R79 | 2.2 MΩ |
| R13 | 330 KΩ | R47 | 10 KΩ | R80 | 1 KΩ |
| R14 | 2.2 KΩ | R48∿R49 | 100 KΩ | R81 | 100 KΩ |
| R15∿R17 | 47 KΩ | R50 | 56 Ω | R82 | 2.2 KΩ |
| R18 | 22 KΩ | R51 | 330 KΩ | R83 | 2.7 MΩ |
| R19 | 10 KΩ | R52 | 2.2 KΩ | R84 | 2.2 MΩ |
| R20∿R21 | 100 KΩ | R53∿R54 | 47 KΩ | R85 | 2.2 KΩ |
| R22 | 4.7 KΩ | R55 | 22 KΩ | R86 | 330 KΩ |
| R23∿R24 | 100 KΩ | R56 | 47 KΩ | R87∿R88 | 100 KΩ |
| R 25 | 330 KΩ | R57 | 1 KΩ | R89 | 47 KΩ |
| R26 | 2.2 KΩ | R58 | 2.2 KΩ | R90 | 22 KΩ |
| R27 | 2.2 MΩ | R59 | 100 KΩ | R91∿R92 | 47 KΩ |
| R28 | 2.7 MΩ | R60 | 2.7 MΩ | R93 | 4.7 KΩ |
| R29 | 2.2 KΩ | R61 | 4.7 KΩ | R94∿R97 | 100 KΩ |
| R30 | 100 KΩ | R62 | 2.2 MΩ | R98 | 10 KΩ |
| R31 | 1 KΩ | R63 | 2.2 KΩ | R99∿R100 | 100 KΩ |
| R32 | 2.7 MΩ | R64 | 330 KΩ | R101 | 10 KΩ |
| R33 | 2.2 KΩ | R65∿R68 | 100 KΩ | R102 | 2.2 KΩ |
| R34 | 1 KΩ | R69 | 10 KΩ | R103 | 330 KΩ |
| R35 | 100 KΩ | R70 | 47 KΩ | | |

**Capacitors**

| | | | | | |
|---|---|---|---|---|---|
| C1 | 0.012 μF | C22 | 0.033 μF | C43 | 4700 pF |
| C2 | 0.047 μF | C23 | 1000 pF | C44 | 8200 pF |
| C3 | 8200 pF | C24 | 0.022 μF | C45 | 0.047 μF |
| C4 | 0.01 μF | C25 | 0.01 μF | C46 | 0.027 μF |
| C5 | 1000 pF | C26 | 0.033 μF | C47 | 0.022 μF |
| C6 | 0.01 μF | C27 | 50V1μ | C48 | 1000 pF |
| C7 | 3300 pF | C28 | 0.01 μF | C49 | 0.01 μF |
| C8 | 6800 pF | C29 | 0.018 μF | C50 | 0.033 μF |
| C9 | 50V1μBP | C30 | 0.01 μF | C51 | 0.047 μF |
| C10 | 0.01 μF | C31 | 0.027 μF | C52 | 50V1μBP |
| C11 | 0.018 μF | C32 | 0.01 μF | C53 | 6800 pF |
| C12 | 1000 pF | C33 | 50V1μBP | C54 | 0.015 μF |
| C13 | 0.018 μF | C34 | 10V33μ | C55 | 0.01 μF |
| C14 | 0.047 μF | C35 | 0.015 μF | C56 | 0.01 μF |
| C15 | 0.01 μF | C36 | 0.047 μF | C57 | 0.047 μF |
| C16 | 0.01 μF | C37 | 0.012 μF | C58 | 1000 pF |
| C17 | 5600 pF | C38 | 0.015 μF | C59 | 0.047 μF |
| C18 | 50V1μBP | C39 | 1000 pF | C60 | 0.01 μF |
| C19 | 0.018 μF | C40 | 0.01 μF | C61 | 0.027 μF |
| C20 | 0.047 μF | C41 | 0.01 μF | C62 | 0.012 μF |
| C21 | 50V1 μ | C42 | 50V1μBP | C63 | 50V1μBP |

**Diodes**

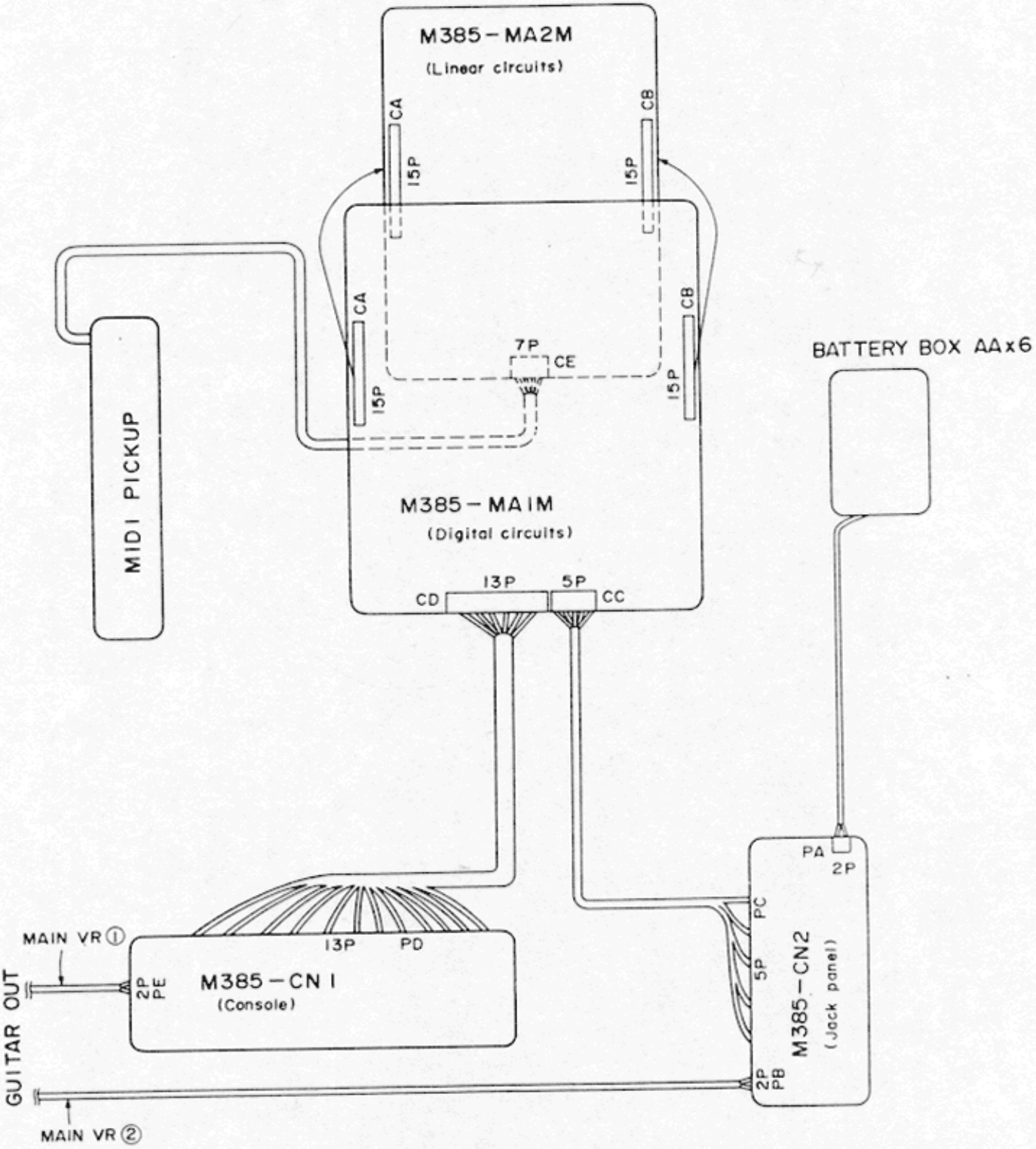
| | |
|---|---|
| D1∿D6 | ISS220 |

**Others**

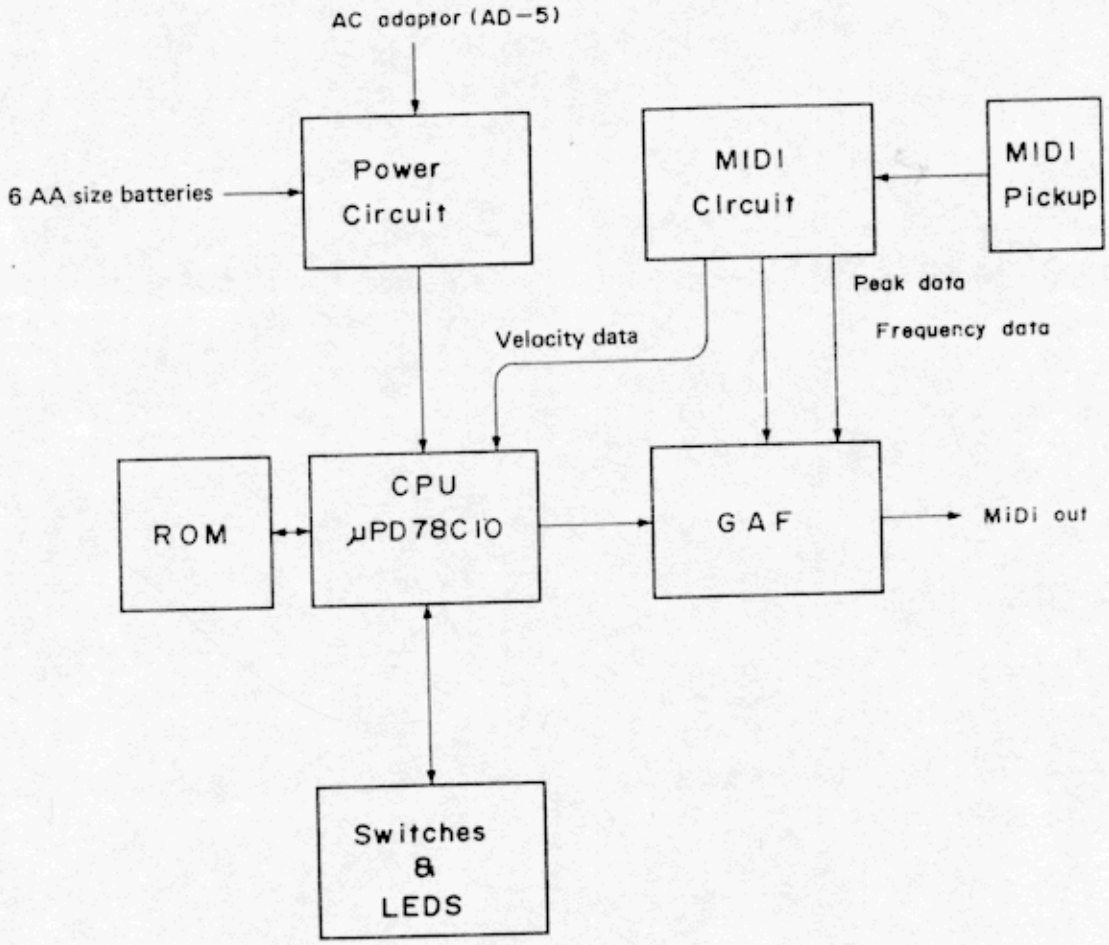
| | |
|---|---|
| IC1∿4, 6∿13 | NJM064M |
| IC5 | BA4558F-DX |
| FET | 2SK30ATMY |
| SW | A6D-9103 |

# 3 CIRCUIT DESCRIPTION

## 3-1 WIRING DIAGRAM



## 3-2 BLOCK DIAGRAM



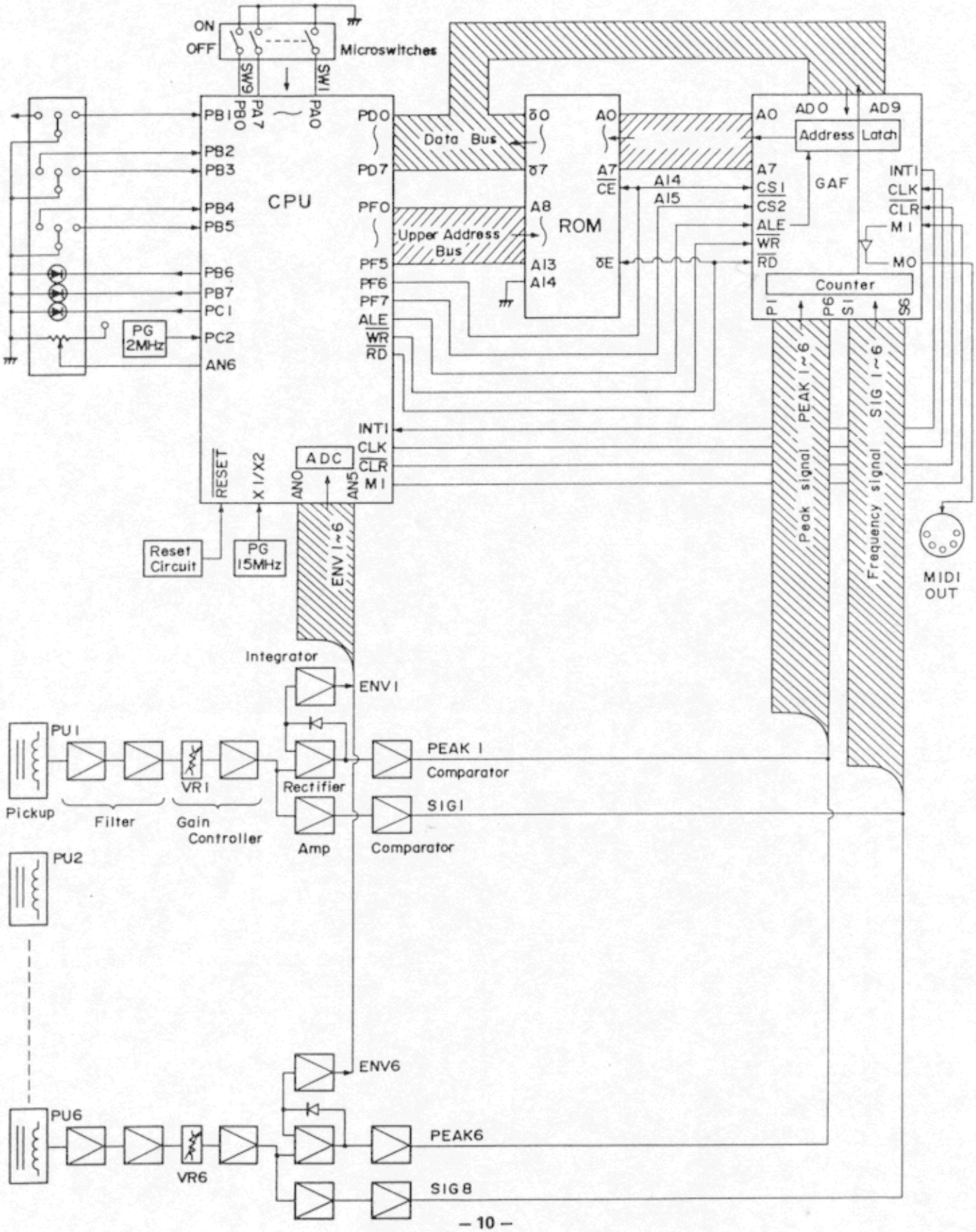

Linear Circuit separates the signal from MIDI pickup into three kinds of data which are velocity, peak, and frequency data.

Gate Array F contains sexadecimal counters which counts up frequency data and send it to CPU as a pitch data. Peak signal is used for the timing signal of the counters.

Velocity data is transformed into digital data in built-in ADCs in CPU.

The pitch and the velocity data are converted into MIDI signal in CPU and sent to MIDI OUT terminal via a buffer in Gate Array F.

## 3-3 CIRCUIT BLOCK



## 4 CPU (μPD78C10G) PIN FUNCTIONS

| Pin No. | Terminal | Signal | In/Out | Function |
|---|---|---|---|---|
| 59<br>~<br>64<br>1<br>2<br>3 | PA0<br>~<br>PA5<br>PA6<br>PA7<br>PB0 | SW1<br>~<br>SW9 | In | Inputs from the DIP switches |
| 4 | PB1 | S1 | In | Low when mode switch is "GUITAR" |
| 5 | PB2 | S2 | In | Low when octabe switch is "UP" |
| 6 | PB3 | S3 | In | Low when octabe switch is "DOWN" |
| 7 | PB4 | S4 | In | Low when mode switch is "PROGRAM" |
| 8 | PB5 | S5 | In | Low when mode switch is "BEND" |
| 9 | PB6 | LD3 | Out | ♭ LED drive signal. Low active. |
| 10 | PB7 | LD2 | Out | # LED drive signal. Low active. |
| 11 | PC0 | M1 | Out | MIDI data output |
| 12 | PC1 | LD1 | Out | Pilot lamp drive signal. Low active. |
| 13 | PC2 | - | In | 2M Hz MIDI clock pulse input |
| 14 | PC3 | $\overline{CLR}$ | Out | Resets gate array's built-in counters |
| 15 | PC4 | CLK | Out | Clock signal for gate array's built-in counter |
| 16 | PC5 | - | - | Not used |
| 17 | PC6 | - | In | The guitar becomes self diagnostic mode when this terminal is Low and power switch is turned on. |
| 18, 19 | PC7,NMI | - | - | Not used |
| 20 | INT1 | INT1 | In | Interrupt from the gate array |
| 21 | MODE1 | - | - | Not used |
| 22 | $\overline{RESET}$ | - | In | Power ON reset signal input |
| 23 | MODE0 | - | - | Not used |
| 24, 25 | X2, X1 | - | In/Out | 15M Hz clock pulse input/output |
| 26 | VSS | - | - | Ground (0 V) source |
| 27 | AVSS | - | - | Ground for the built-in ADCs |
| 28 | AN0 | ENV1 | In | Envelope signal from the 1st string |
| 29 | AN1 | ENV2 | In | Envelope signal from the 2nd string |
| 30 | AN2 | ENV3 | In | Envelope signal from the 3rd string |
| 31 | AN3 | ENV4 | In | Envelope signal from the 4th string |
| 32 | AN4 | ENV5 | In | Envelope signal from the 5th string |
| 33 | AN5 | ENV6 | In | Envelope signal from the 6th string |
| 34, 35 | AN6, AN7 | - | - | Not used |
| 36 | VREF | - | In | Reference voltage (+5 V) for the built-in ADCs |
| 37 | AVDD | - | In | +5 V source for built-in ADCs |

| | | | | |
|---|---|---|---|---|
| 38 | $\overline{RD}$ | R | Out | Memory read signal |
| 39 | $\overline{WR}$ | | Out | Memory write signal |
| 40 | ALE | - | Out | Address Latch Enable.<br>Data bus PDO - PD7 become lower address (A0-A7) bus. |
| 41 - 48 | PF0-PF7 | - | Out | Upper address (A8 - A15) bus |
| 49 - 56 | PD0-PD7 | - | In/out | Data bus |
| 57 | $\overline{STOP}$ | - | - | Not used |
| 58 | VDD | - | - | +5 V source |

## F GATE ARRAY F

The gate array contains counters which detects the frequency of string vibration, an address latch, and a MIDI data buffer. The following is the pin function of the gate array.

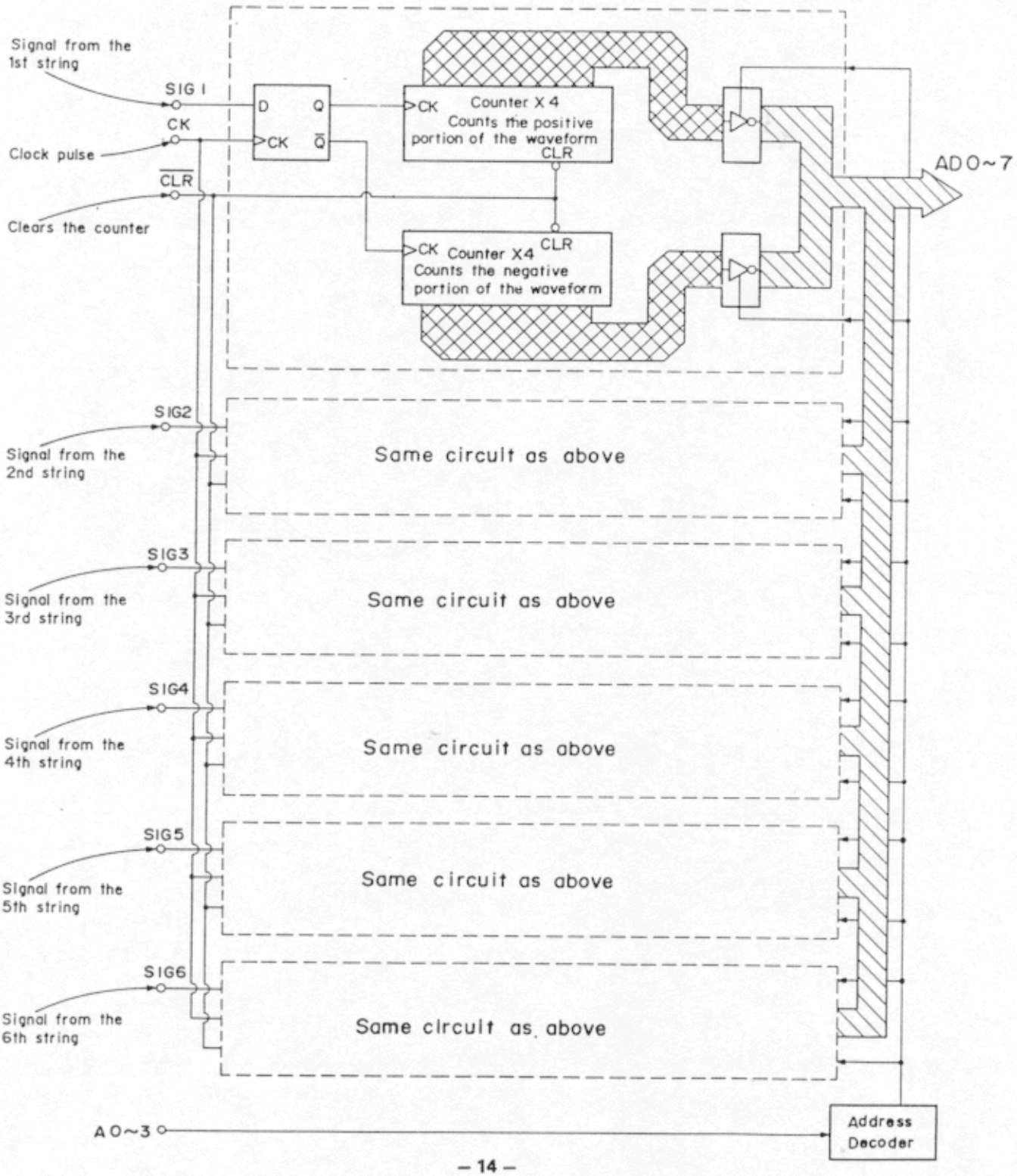
| Pin No. | Terminal | Signal | In/Out | Function |
|---|---|---|---|---|
| 1 - 10 | AD0-AD7 | AD0-AD7 | In/Out | Data bus |
| 3, 7 | GND | DG | - | Ground (0 V) source |
| 11 - 20 | A0-A7 | A0-A7 | Out | Lower address bus |
| 12, 23 | $\overline{CS2}$, CS1 | A15, A14 | In | Built-in counter provides frequency data from data bus when this terminal is Low and terminal CS1 is High |
| 21 | VDD1 | VDD | - | +5 V source |
| 22 | ALE | ALE | In | Address Latch Enable signal. When this terminal is High, the contents of data bus are latched and become lower address bus (A0 - A7). |
| 24 | $\overline{WR}$ | $\overline{WR}$ | In | When Low, peak signals from the strings cannot be entered. |
| 25 | VDD2 | VDD | - | +5 V source |
| 26 | $\overline{RD}$ | $\overline{RD}$ | In | When Low, note number is provided in data bus. |
| 27 | P1 | PEAK 1 | In | 1st string's peak signal input |
| 28 | S1 | SIG 1 | In | 1st string's frequency signal input |
| 29 | P2 | PEAK 2 | In | 2nd string's peak signal input |
| 30 | S2 | SIG 2 | In | 2nd string's frequency signal input |
| 31 | P3 | PEAK 3 | In | 3rd string's peak signal input |
| 32 | S3 | SIG 3 | In | 3rd string's frequency signal input |
| 33 | GND | DG | - | Ground (0 V) source |
| 34 | VDD | VDD | In | +5 V source |
| 35 | P4 | PEAK 4 | In | 4th string's peak signal input |
| 36 | S4 | SIG 4 | In | 4th string's frequency signal input |

| | | | | |
|---|---|---|---|---|
| 37 | P5 | PEAK 5 | In | 5th string's peak signal input |
| 38 | S5 | SIG 5 | In | 5th string's frequency signal input |
| 39 | P6 | PEAK 6 | In | 6th string's peak signal input |
| 40 | S6 | SIG 6 | In | 6th string's frequency signal input |
| 41 - 45 | - | - | - | Not used |
| 46 | M0 | M0 | Out | MIDI data output |
| 47 | $\overline{CLR}$ | $\overline{CLR}$ | In | Frequency detection counter reset signal |
| 48 | MI | MI | In | MIDI data input |
| 49 | CK | CLK | In | Clock pulse for frequency detection counter |
| 50 | INT1 | INT1 | Out | Interrupt to CPU |
| 51, 52 | - | - | - | Not used |

## 6 INTERNAL CIRCUITS OF GATE ARRAY F

### (1) Frequency Detection Counter

In order to detect the frequency of strings' vibrations, sexadecimal counter in Gate Array F counts up the positive and negative portions of the waveform from the strings, and provides digital data to CPU via data bus.

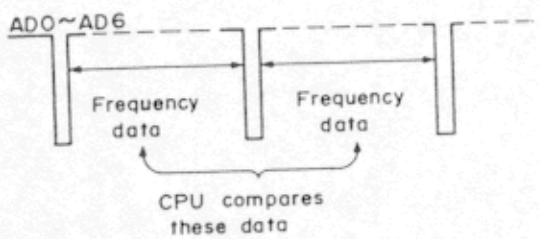


(2) Peak Detection Circuit

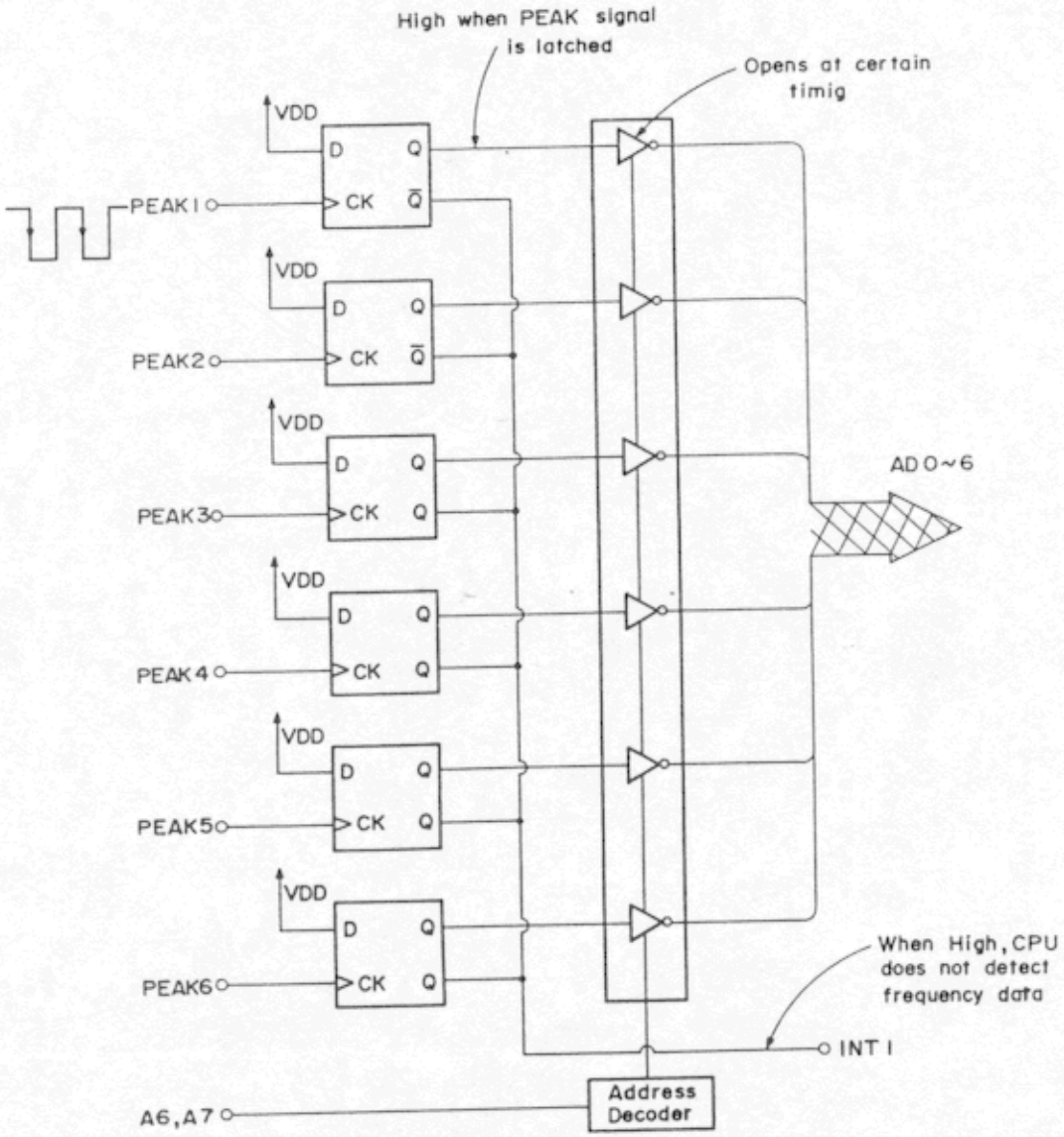
The circuit disregards abnormal string vibration which may occur at the beginning and the end of string vibration and detects the accurate frequency of string vibrations.

PEAK signals are provided at the peaks of string vibration waveform and latched in the flip flops. While a PEAK signal is latched, output Q of the flip flop rises to High level.

At certain timing, CPU opens the tri-state inverters by signals A6 and A7 so that data bus drop to Low.
CPU receives frequency data from the counters between the period of being Low of AD0 - AD6.
Every time CPU receives data, it compares the frequency with the formerly detected data and if there is a difference between the two data, CPU disregards the former data in order to detect the accurate frequency.

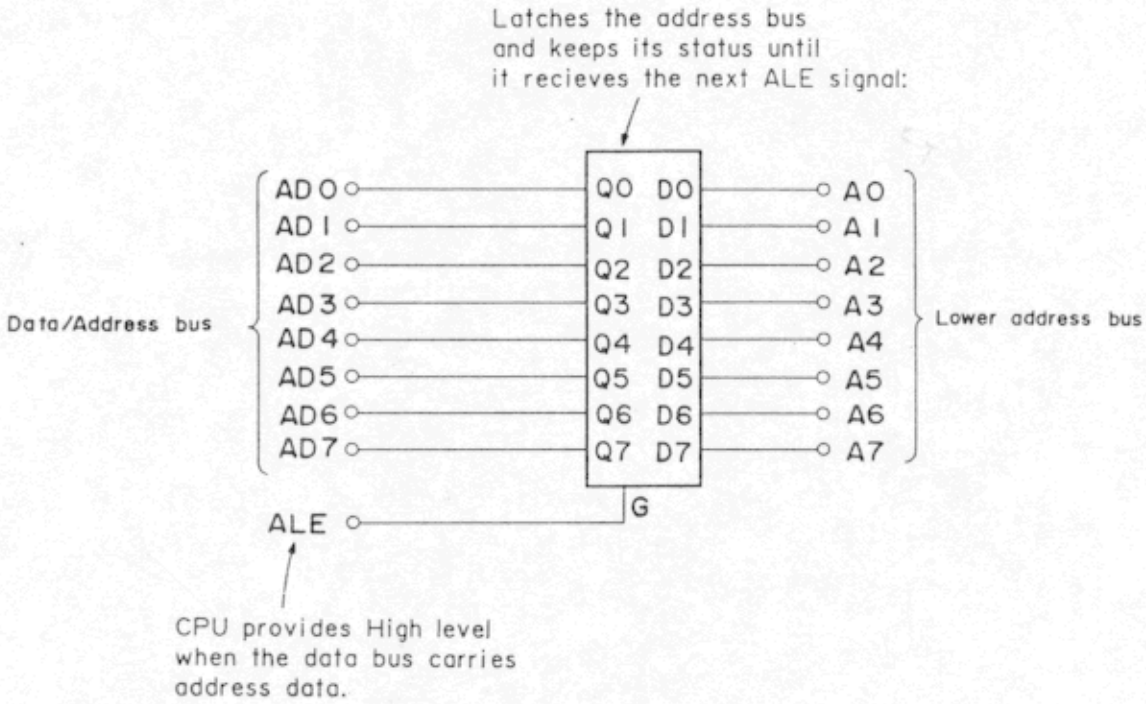



When PEAK signals are not provided, Q outputs of the flip flops interrupt the CPU via INT 1 terminal.
Receiving INT I, CPU stops detecting frequency data.



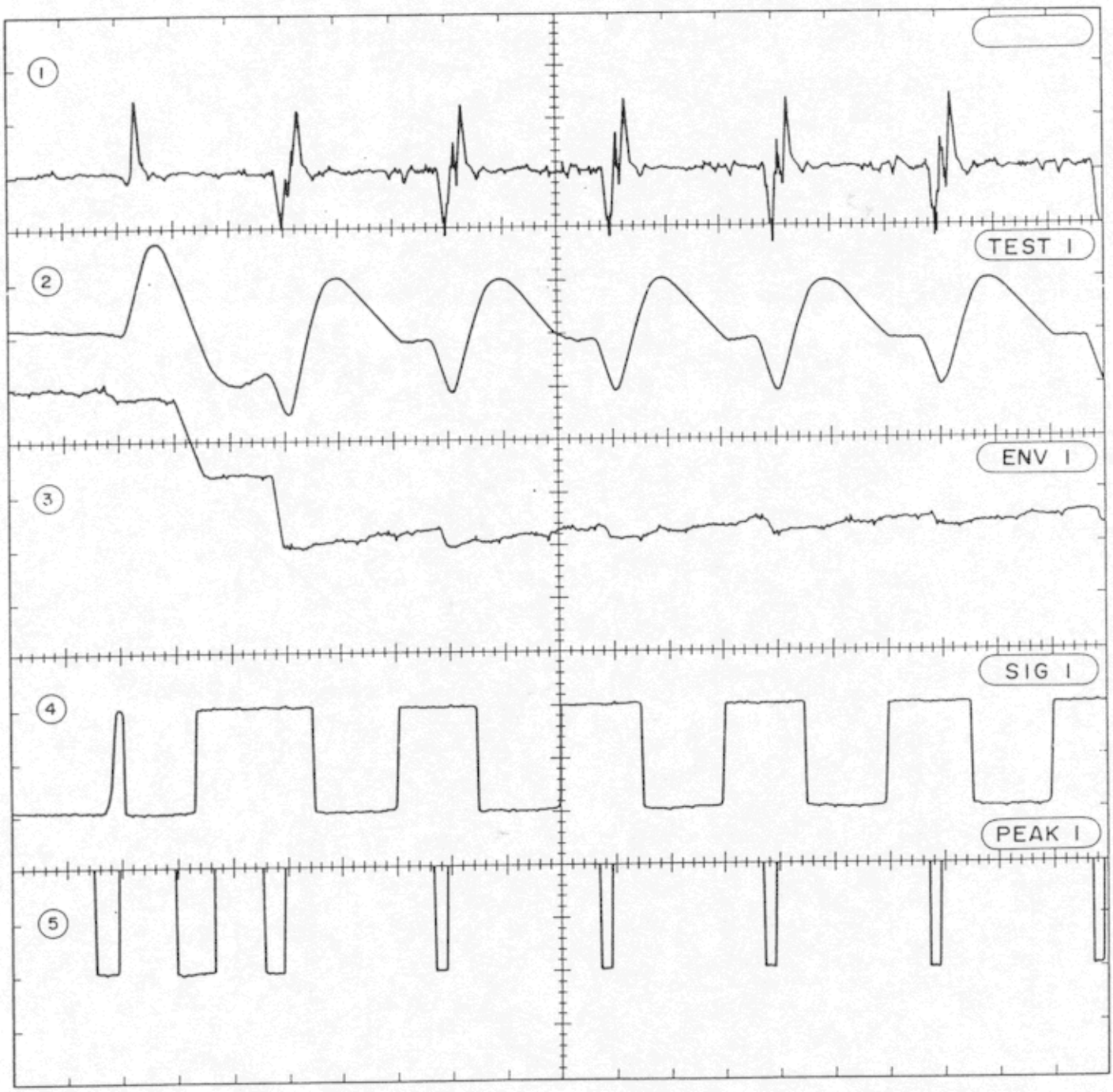
(3) Address Latch

Receiving signal ALE from CPU, signals AD0 - AD7 are latched in and become lower address signals A0 - A7.



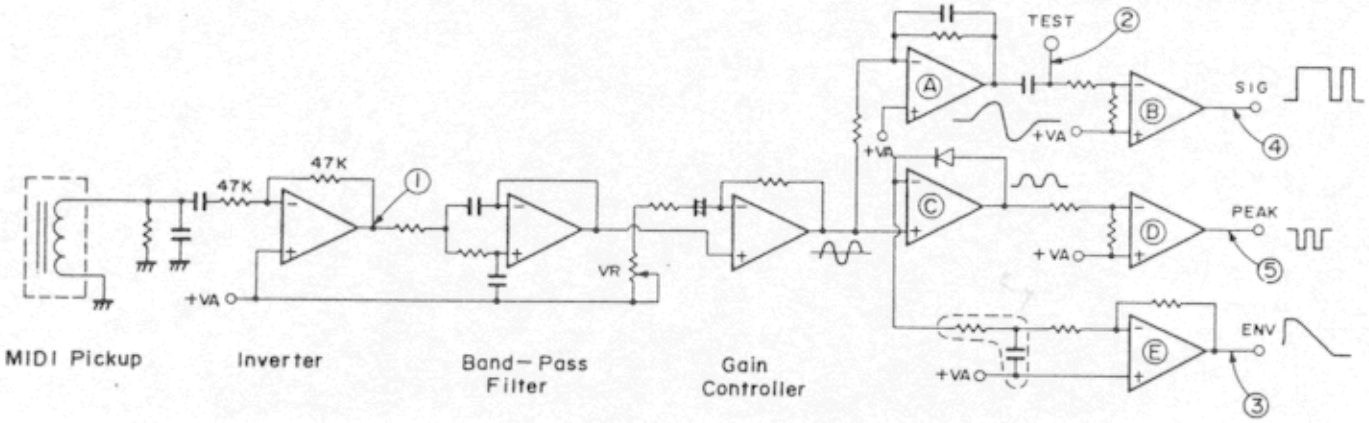

(4) MIDI Buffer

Amplifies the MIDI output signal from CPU.


1
TEST I
2
ENV I
3
SIG I
4
PEAK I
5

## 7 MIDI CIRCUITS

MIDI pickup converts the string vibration into current value.




After inverted, filtered, and gain-controlled, the signal from MIDI pickup is separated in three different signals.

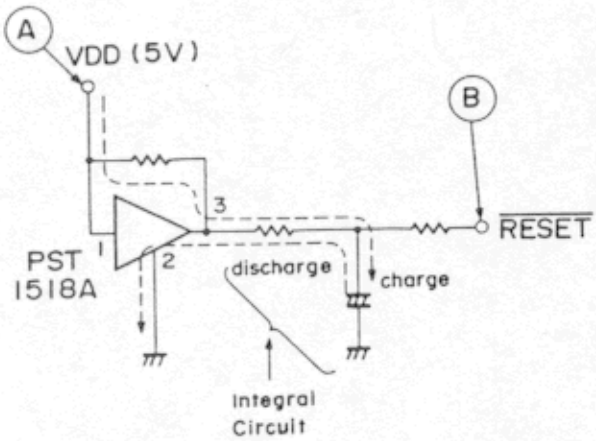
(1) SIG – – – For detecting the string frequency.
Integral circuit Ⓐ eliminates the harmonics and, Comparator Ⓑ turns the signal into square waveform.

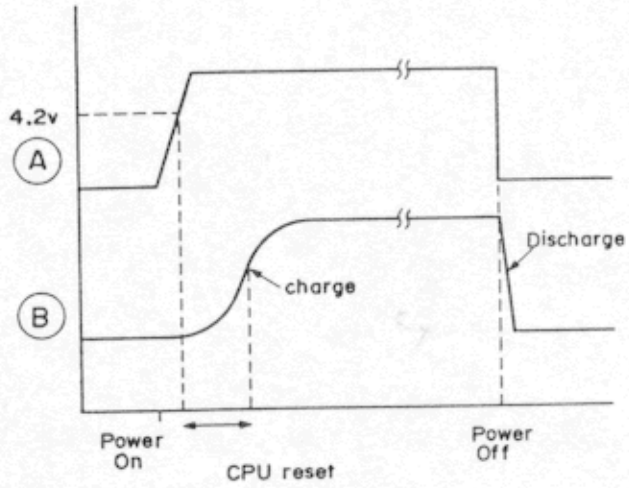
(2) PEAK– – Timing signal for frequency detection.
Rectifier Ⓒ extracts only positive portion of the waveform and, Comparator Ⓓ inverts and turns it into a square waveform.

(3) ENV – – For the velocity and note ON/OFF detection.
From Rectifier output, an integral circuit of a capacitor and a resistor extracts the envelope signal only and, op amp Ⓔ amplifiers the envelope signal.

Actual waveforms at checkpoints ①~ ⑤ are shown on the next page.

## 8 RESET CIRCUIT

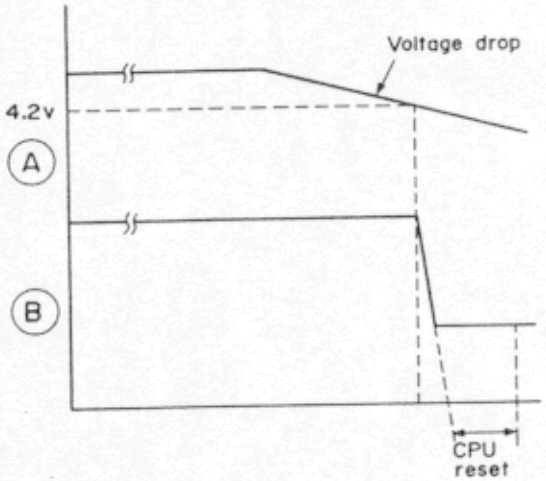



In order to initialize CPU's internal circuits at Power ON, a voltage detector IC PST1518A generates $\overline{\text{RESET}}$ signal.

PST-1518 receives VDD (+5 V) from pin 1 and outputs Low level signal from pin 3 while the input voltage is less than +4.2 V and, pin 3 provides High level when VDD is more than +4.2 V.

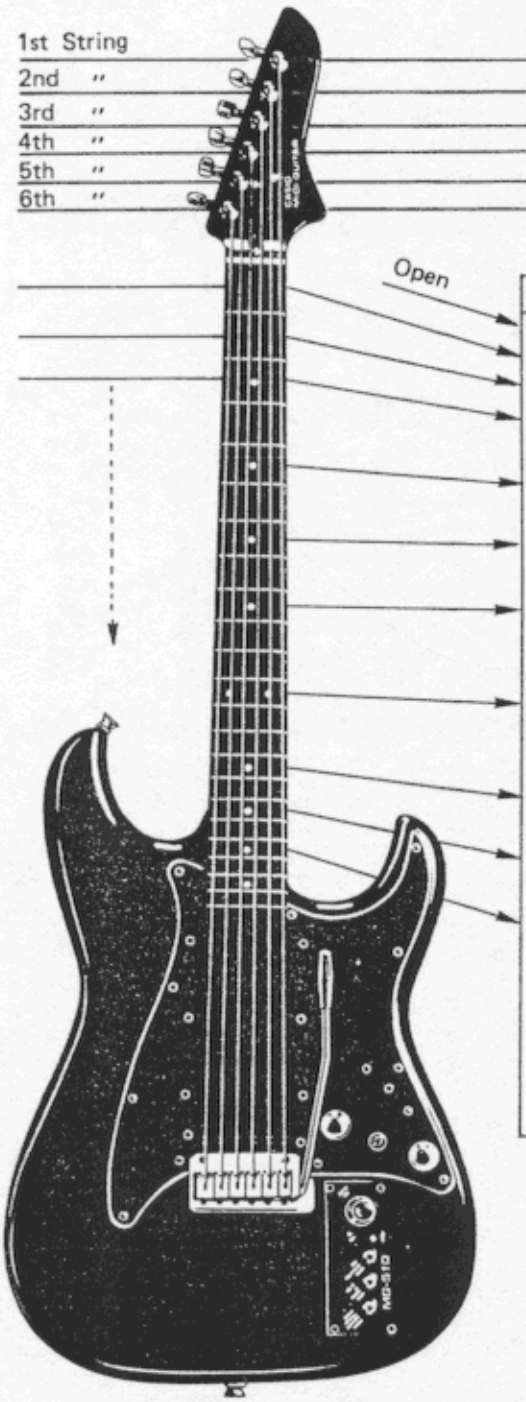
When the power switch is turned on, signal $\overline{\text{RESET}}$ rises to High level gradually by the integral circuit.
CPU then resets its internal circuits while $\overline{\text{RESET}}$ is Low.




When the power switch is turned off, the capacitor immediately discharges itself through pin 2 of PST1518A so that signal RESET is provided even the power switch is turned on, off, and on quickly.

CPU is also reset when the battery is weak and VDD becomes less than +4.2 V.

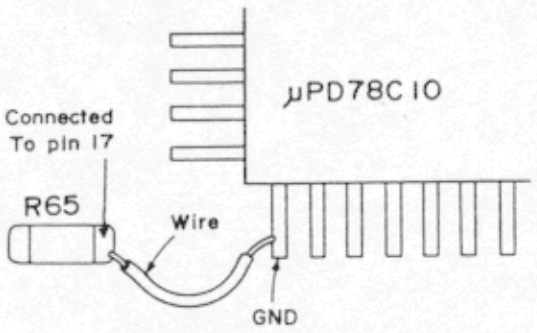
## 9 RELATION BETWEEN FRET PITCH & FREQUENCY




| | #6 | #5 | #4 | #3 | #2 | #1 |
|---|---|---|---|---|---|---|
| 0 | 82.41 | 110.00 | 146.83 | 196.00 | 246.94 | 329.63 |
| 1 | 87.31 | 116.54 | 155.56 | 207.65 | 261.63 | 349.23 |
| 2 | 92.50 | 123.47 | 164.81 | 220.00 | 277.18 | 369.99 |
| 3 | 98.00 | 130.81 | 174.61 | 233.08 | 293.66 | 392.00 |
| 4 | 103.83 | 138.59 | 185.00 | 246.94 | 311.13 | 415.30 |
| 5 | 110.00 | 146.83 | 196.00 | 261.63 | 329.63 | 440.00 |
| 6 | 116.54 | 155.56 | 207.65 | 277.18 | 349.23 | 466.16 |
| 7 | 123.47 | 164.81 | 220.00 | 293.66 | 369.99 | 493.88 |
| 8 | 130.81 | 174.61 | 233.08 | 311.13 | 392.00 | 523.25 |
| 9 | 138.59 | 185.00 | 246.94 | 329.63 | 415.30 | 554.37 |
| 10 | 146.83 | 196.00 | 261.63 | 349.23 | 440.00 | 587.33 |
| 11 | 155.56 | 207.65 | 277.18 | 369.99 | 466.16 | 622.25 |
| 12 | 164.81 | 220.00 | 293.66 | 392.00 | 493.88 | 659.26 |
| 13 | 174.61 | 233.08 | 311.13 | 415.30 | 523.25 | 698.46 |
| 14 | 185.00 | 246.94 | 329.63 | 440.00 | 554.37 | 739.99 |
| 15 | 196.00 | 261.63 | 349.23 | 466.16 | 587.33 | 783.99 |
| 16 | 207.65 | 277.18 | 369.99 | 493.88 | 622.25 | 830.61 |
| 17 | 220.00 | 293.66 | 392.00 | 523.25 | 659.26 | 880.00 |
| 18 | 233.08 | 311.13 | 415.30 | 554.37 | 698.46 | 932.33 |
| 19 | 246.94 | 329.63 | 440.00 | 587.33 | 739.99 | 987.77 |
| 20 | 261.63 | 349.23 | 466.16 | 622.25 | 783.99 | 1046.50 |
| 21 | 277.18 | 369.99 | 493.88 | 659.26 | 830.61 | 1108.73 |
| 22 | 293.66 | 392.00 | 523.25 | 698.46 | 880.00 | 1174.66 |
| 23 | 311.13 | 415.30 | 554.37 | 739.99 | 932.33 | 1244.51 |
| 24 | 329.63 | 440.00 | 587.33 | 783.99 | 987.77 | 1318.51 |
| 25 | 349.23 | 466.16 | 622.25 | 830.61 | 1046.50 | 1396.91 |

## 10 TEST MODE

(1) To start the test program, connect pin 17 of CPU to the ground.




Then turn the power switch on.

(2) ROM/RAM TEST

If all the LEDs illuminate, ROM (UPD23C256EG) is faulty and, if CPU's built-in RAM is faulty, all the LEDs flashes.

(3) Switch test

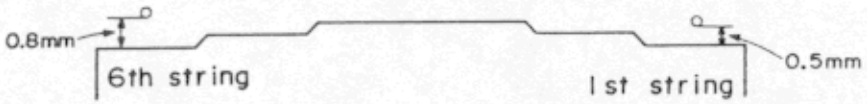
Each switches' contacts are checked by turning on an off of the corresponding LEDs. Set Guitar/MIDI switch on "Guitar/MIDI", Octave switch on "Normal", Chromatic/ Program Change switch on "Chromatic", and all the Microswitches on "OFF".

The test should be done by the following order.

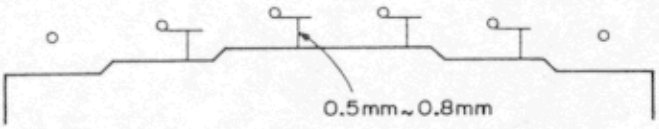
| Switch | Position | LED | | |
|---|---|---|---|---|
| Guitar/MIDI | Guitar | ♭ | | ON |
| | Guitar/MIDI | ♭ | | OFF |
| Octave | Down | # | | ON |
| | Normal | # | | OFF |
| | Up | # | | ON |
| | Normal | # | | OFF |
| Chromatic/ Program Change | Normal | Prog. Change | | ON |
| | Chromatic | Prog. Change | | OFF |
| | Prog. Change | Prog. Change | | ON |
| | Chromatic | Prog. Change | | OFF |
| Microswitches | | ♭ | # | Prog. Change |
| * Turn the switch off after each checking. | SW1 ON | ON | OFF | OFF |
| | SW2 ON | OFF | ON | OFF |
| | SW3 ON | ON | ON | OFF |
| | SW4 ON | OFF | OFF | ON |
| | SW5 ON | ON | OFF | ON |
| | SW6 ON | OFF | ON | ON |
| | SW7 ON | ON | ON | ON |
| | SW8 ON | Flash | OFF | OFF |
| | SW9 ON | OFF | Flash | OFF |

MIDI Pickup Adjustment

Adjust the MIDI pickup so that the clearance between the 1st and 6th strings and the pickup is as shown below.




When the MIDI pickup height is set as above, the clearances between the 2nd ∿ 5th strings and the pickup are automatically set within 0.5 mm to 0.8 mm.
If the clearances are not within the said value, perform the bridge height adjustment as shown on page .



# PARTS LIST

MG – 500/510

Notes:
1. Prices and specifications are subject to change without prior notice.
2. As for spare parts order and supply, refer to the "GUIDEBOOK for Spare Parts Supply", published separately.
3. The numbers in item column correspond to the same numbers in drawing.

| Item | Code No. | Parts Name | Specification | Q'ty | * | Unit Price N.R.Yen (¥) (FOB:JAPAN) | RANK |
|---|---|---|---|---|---|---|---|
| | | **1) M385-MAIN PCB ASS'Y** | | | | | |
| ☆ | 20103409 | LSI | UPD78C10G-1B-X | 1 | | | A |
| ☆ | 20103675 | LSI | UPD65031GC-169-3B6 | 1 | | | A |
| ☆ | 20103682 | LSI (ROM) | UPD27C256AG-20M384 | 1 | | | A |
| ☆ | 21050644 | C-MOS IC | UPD74HCU04G | 1 | | | A |
| ☆ | 21140413 | Monolithic IC | NJM78L05A | 1 | | | A |
| ☆ | 21140441 | Monolithic IC | PST518A | 1 | | | A |
| | 25201469 | Ceramic oscillator | CSA2.000MK | 1 | | | A |
| | 25900042 | Crystal oscillator | NR-18-15.000MHZ | 1 | | | A |
| ☆ | 23600609 | Zener diode | HZM5C-TR | 1 | 20 | | B |
| ☆ | 23900357 | Zener diode | ISS193TE85L | 2 | 20 | | B |
| ☆ | 27920462 | Chip resistor | MCR10EZHJ473 | 14 | 20 | | C |
| | 27920470 | Chip resistor | MCR10EZHJ102 | 19 | 20 | | C |
| ☆ | 27920807 | Chip resistor | MCR10EZHJ470 | 1 | 20 | | C |
| | 27920815 | Chip resistor | MCR10EZHJ221 | 2 | 20 | | C |
| ☆ | 27920831 | Chip resistor | MCR10EZHJ103 | 5 | 20 | | C |
| ☆ | 27921051 | Chip resistor | MCR10EZHJ222 | 1 | 20 | | C |
| ☆ | 27950532 | Chip resistor | MCR10EZHJ105 | 1 | 20 | | C |
| ☆ | 28076056 | Chip electrolytic capacitor | ECE-V1EV4R7R | 1 | 20 | | C |
| ☆ | 28076063 | Chip electrolytic capacitor | ECE-V1CV100R | 4 | 20 | | C |
| ☆ | 28076105 | Chip electrolytic capacitor | ECE-V1CV220UR | 1 | 20 | | C |
| ☆ | 28076119 | Chip electrolytic capacitor | ECE-V1AV330UR | 1 | 20 | | C |
| ☆ | 28450294 | Chip electrolytic capacitor | T1-21N1HR331K-T | 8 | 20 | | C |
| ☆ | 28450301 | Chip electrolytic capacitor | T1-21N1HR221K-T | 27 | 20 | | C |
| ☆ | 28450308 | Chip electrolytic capacitor | T1-21N1EF103Z-T | 5 | 20 | | C |
| ☆ | 28450469 | Chip electrolytic capacitor | T1-21N1HCG560J-T | 2 | 20 | | C |
| ☆ | 28450476 | Chip electrolytic capacitor | T1-21N1HCG150J-T | 2 | 20 | | C |
| ☆ | 35011344 | PCB connector | IL-S-13P-S2L2-EF | 1 | 10 | | C |
| ☆ | 35011351 | PCB connector | IL-S-5P-S2L2-EF | 1 | 20 | | C |
| ☆ | 35011365 | PCB connector | PS-15SD-S4TS1-1 | 2 | | | C |
| ☆ | 38410406 | Coil | SBC-03 | 1 | 5 | | C |
| ☆ | 43077910 | Blank PCB M385-MA1M | M210019-1 | 1 | | | X |
| ☆ | 69133970 | Spacer 5.5 | M4948-12 | 4 | 20 | | X |
| | | **2) M385-MA2M PCB ASS'Y** | | | | | |
| ☆ | 21140399 | Monolithic IC | BA4558F-DX | 1 | | | A |
| ☆ | 21140406 | Monolithic IC | NJM064M | 12 | | | A |
| | 22405136 | FET | 2SK30ATM-Y | 1 | | | A |
| ☆ | 23900357 | Chip diode | 1SS193TE85L | 6 | 20 | | C |
| ☆ | 27300549 | Chip resistor | MCR10EZHJ225 | 6 | 20 | | C |
| ☆ | 27650441 | Semi-fixed resistor | EVN-1ACA00B14 | 6 | 10 | | B |
| ☆ | 27650455 | Semi-fixed resistor | EVN-1ACA00B53 | 1 | 10 | | B |

Note: ☆ — Newly employed parts
Q'ty — Quantity used per unit
* — Minimum order/supply quantity

Rank A: Essential
B: Stock recommended
C: Others
X: No stock recommended

| Item | Code No. | Parts Name | Specification | Q'ty | * | Unit Price N.R. Yen (¥) (FOB: JAPAN) | RANK |
|---|---|---|---|---|---|---|---|
| ☆ | 27920209 | Chip resistor | MCR10EZHJ104 | 30 | 20 | | C |
| ☆ | 27920462 | Chip resistor | MCR10EZHJ473 | 18 | 20 | | C |
| | 27920470 | Chip resistor | MCR10EZHJ102 | 6 | 20 | | C |
| ☆ | 27920799 | Chip resistor | MCR10EZHJ472 | 6 | 20 | | C |
| ☆ | 27920831 | Chip resistor | MCR10EZHJ103 | 6 | 20 | | C |
| ☆ | 27920888 | Chip resistor | MCR10EZHJ334 | 6 | 20 | | C |
| ☆ | 27921043 | Chip resistor | MCR10EZHJ223 | 6 | 20 | | C |
| ☆ | 27921051 | Chip resistor | MCR10EZHJ222 | 12 | 20 | | C |
| ☆ | 27950728 | Chip resistor | MCR10EZHJ560 | 1 | 20 | | C |
| ☆ | 27950777 | Chip resistor | MCR10EZHJ275 | 6 | 20 | | C |
| ☆ | 28076084 | Chip electrolytic capacitor | ECE-V1HV010R | 2 | 20 | | C |
| ☆ | 28076091 | Chip electrolytic capacitor | ECE-V1HN010R | 6 | 10 | | C |
| ☆ | 28076119 | Chip electrolytic capacitor | ECE-V1AV330UR | 1 | 20 | | C |
| ☆ | 28450308 | Chip capacitor | T1-21N1EF103Z-T | 12 | 20 | | C |
| ☆ | 28450322 | Chip capacitor | T1-21N1HR103K-T | 3 | 20 | | C |
| ☆ | 28450329 | Chip capacitor | T1-21N1HR102K-T | 6 | 20 | | C |
| ☆ | 28450336 | Chip capacitor | T1-21N1HR123K-T | 3 | 20 | | C |
| ☆ | 28450343 | Chip capacitor | T1-21N1HR682K-T | 2 | 20 | | C |
| ☆ | 28450350 | Chip capacitor | T1-21N1HR332K-T | 1 | 20 | | C |
| ☆ | 28450357 | Chip capacitor | T1-21N1HR472K-T | 1 | 20 | | C |
| ☆ | 28450364 | Chip capacitor | T1-21N1HR822K-T | 2 | 20 | | C |
| ☆ | 28450371 | Chip capacitor | T1-21N1HR153K-T | 3 | 20 | | C |
| ☆ | 28450378 | Chip capacitor | T1-21N1HR183K-T | 4 | 20 | | C |
| ☆ | 28450385 | Chip capacitor | T1-21N1HR562K-T | 1 | 20 | | C |
| ☆ | 28450392 | Chip capacitor | T1-21N1HR223K-T | 2 | 20 | | C |
| ☆ | 28450399 | Chip capacitor | T1-21NER273K-T | 3 | 20 | | C |
| ☆ | 28450406 | Chip capacitor | T1-21N1ER333K-T | 3 | 20 | | C |
| ☆ | 28450413 | Chip capacitor | T1-21N1ER473K-T | 8 | 20 | | C |
| ☆ | 34120252 | DIP switch | A6D-9103 | 1 | | | B |
| ☆ | 35011358 | PCB connector | IL-S-7P-S2L2-EF | 1 | 20 | | C |
| ☆ | 35011372 | PCB connector | PS-15PA-S4T1-PKL1 | 2 | | | C |
| ☆ | 43078000 | Blank PCB M385-MA2M | M210019-2 | 1 | | | X |
| | | **3) M385-CN1 PCB ASS'Y** | | | | | |
| ☆ | 23700154 | LED | LN252RPH | 4 | 20 | | B |
| ☆ | 27650434 | VR | EVH-9LA318B54 | 1 | | | B |
| ☆ | 34120259 | Switch | FTE43 | 3 | | | B |

Note: ☆ – Newly employed parts
Q'ty – Quantity used per unit
* – Minimum order/supply quantity

Rank A: Essential
B: Stock recommended
C: Others
X: No stock recommended

| Item | Code No. | Parts Name | Specification | Q'ty | * | Unit Price N.R. Yen (¥) (FOB: JAPAN) | RANK |
|---|---|---|---|---|---|---|---|
| ☆ | 35011379 | 13P connector M384A | IL-13P-11-M384 | 1 | | | C |
| ☆ | 43077900 | Blank PCB M385-CN1 | M310087-1 | 1 | | | X |
| | | 4) M385-CN2 PCB ASS'Y | | | | | |
| ☆ | 26170613 | Carbon film resistor | R-20-1K-J (1/5W, 1Kohm, ±5%) | 1 | 20 | | C |
| ☆ | 30202147 | Ferrite beads | BLO2RN2-R62 | 1 | 20 | | C |
| ☆ | 34120238 | Slide switch | SSD-22DP | 1 | | | B |
| ☆ | 35010070 | DC jack | HEC2305-01-030 | 1 | | | B |
| ☆ | 35010196 | DIN jack | TCS5350-01-1211 | 1 | | | B |
| ☆ | 35011386 | 5P connector M384B | IL-5P-9-M384 | 1 | | | C |
| ☆ | 35011470 | PCB connector | IL-S-2P-S2T2-EF | 1 | 20 | | C |
| ☆ | 35011477 | Battery snap | PLGW-8533-01A | 1 | | | C |
| ☆ | 36130245 | Jack | HLJ0544-01-110 | 2 | | | B |
| ☆ | 43077950 | Blank PCB M385-CN2 | M310087-2 | 1 | | | X |
| | | 5) OTHERS | | | | | |
| ☆ | 37190147 | MIDI cable | HD-D5P-0001-A | 1 | | | C |
| ☆ 48 | 39010712 | Battery BOX | 36-3 | 1 | | | C |
| ☆ 49 | 69060791 | Decorating screw | M41152A-3 | 2 | 20 | | C |
| ☆ 50 | 69133350 | Battery cover sub ass'y | M410077*1 | 1 | | | C |
| ☆ | 69133990 | Collar | M410090-2 | 1 | 20 | | X |
| ☆ | 69134000 | Collar | M410090-3 | 3 | 20 | | X |
| ☆ | 69011560 | DIN jack rating plate | M4598-1 | 1 | 10 | | X |
| ☆ 51 | 69133360 | Terminal cover | M310009-1 | 1 | | | C |
| ☆ | 69133980 | Collar | M410090-1 | 1 | 10 | | X |
| ☆ 1 | 00077030 | Front panel for MG-500 White and Red body | | 1 | | | C |
| ☆ 1 | 00077031 | Front panel for MG-500 Black body | | 1 | | | C |
| ☆ 1 | 00077032 | Front panel for MG-510 White and Red body | | 1 | | | C |
| ☆ 1 | 00077033 | Front panel for MG-510 Black body | | 1 | | | C |
| ☆ 2 | 00077034 | Pickup (Front) | MX-S F | 1 | | | B |
| ☆ 3 | 00077035 | Pickup (Middle) | MX-S M | 1 | | | B |
| ☆ 4 | 00077036 | Pickup (Rear) | MX-H | 1 | | | B |
| ☆ 5 | 00077037 | Pickup (MIDI) | Hex PU | 1 | | | B |
| ☆ 6 | 00077038 | Control panel | MG-500 | 1 | | | C |
| ☆ 6 | 00077039 | Control panel | MG-510 | 1 | | | C |

Note: ☆ — Newly employed parts
Q'ty — Quantity used per unit
* — Minimum order/supply quantity

Rank A: Essential
B: Stock recommended
C: Others
X: No stock recommended

| Item | Code No. | Parts Name | Specification | Q'ty | * | Unit Price N.R. Yen (¥) (FOB: JAPAN) | RANK |
|---|---|---|---|---|---|---|---|
| ☆ 7 | 00077040 | Variable resistor (for Volume) | 500K G short shaft | 1 | | | B |
| ☆ 8 | 00077041 | Variable resistor (for Tone) | 500K D short shaft | 1 | | | B |
| ☆ 9 | 00077042 | Control knob | MX-384 | 2 | | | C |
| ☆ 10 | 00077043 | Select switch | YM-50 | 1 | | | B |
| ☆ 11 | 00077044 | Mini switch | MTN-301 | 1 | | | B |
| | 00077045 | Capacitor | Milar 0.002 μF | 1 | 20 | | C |
| | 00077046 | Capacitor | Ceramic, 47 pF | 1 | 20 | | C |
| ☆ 12 | 00077047 | Tuning knob set | SG38-07/L SET | 1 | | | C |
| | | Consists of the followings. | | | | | |
| ☆ 12-1 | 00077049 | Tuning knob | SG38-07/L | 6 | | | C |
| ☆ 12-2 | 00077050 | Nut | | 6 | 5 | | X |
| ☆ 12-3 | 00077051 | Washer | | 6 | 10 | | X |
| ☆ 13 | 00077052 | Neck joint plate | NPF/No mark, Black | 1 | | | X |
| ☆ 14 | 00077053 | Joint plate cushion | 6st, Black | 1 | 10 | | C |
| ☆ 15 | 00077054 | PCB Cover | MX-384, Metal Black | 1 | | | C |
| ☆ 16 | 00077055 | Tremolo cover for White body | STC (P:11) | 1 | 5 | | C |
| ☆ 16 | 00077056 | Tremolo cover for Black and Red body | STC (P:11) | 1 | | | C |
| ☆ 17 | 00077057 | Strap button | Type F, Black | 2 | 10 | | C |
| ☆ 18 | 00077058 | Felt washer | Black | 2 | 20 | | C |
| ☆ 19 | 00077059 | String holder | Type F, Black | 2 | 10 | | C |
| ☆ 20 | 00077060 | String holder coller | 2.5 mm, Black | 1 | 20 | | C |
| ☆ 21 | 00077061 | String holder coller | 4.0 mm, Black | 1 | 20 | | C |
| | 00077062 | Wrench (Large) | 4 x 30 | 1 | 10 | | C |
| | 00077063 | Wrench (Small) | 1.5 mm | 1 | 20 | | C |
| ☆ 22 | 00077065 | Rubber plate | MX384, Black | 2 | | | C |
| | 00077066 | String set | XL 009 | 1 | | | X |
| ☆ 23 | 00077067 | Jack cord | Mold, 2M | 1 | | | C |
| ☆ 24 | 00077068 | Tremolo unit | S-87 | 1 | | | C |
| | | Consists of the followings: | | | | | |
| ☆ 24-1 | 00077070 | Tremolo plate | Black | 1 | | | C |
| ☆ 24-2 | 00077071 | Tremolo block | Black | 1 | | | C |
| ☆ 24-3 | 00077072 | Tremolo saddle | Black | 6 | | | C |
| ☆ 25 | 00077073 | Tremolo arm | S-87, Black | 1 | | | C |
| ☆ 26 | 00077074 | Stud bolt | S-87, Black | 2 | 5 | | C |
| ☆ 27 | 00077075 | Tremolo spring | Nickel | 3 | 5 | | C |

Note: ☆ – Newly employed parts
Q'ty – Quantity used per unit
* – Minimum order/supply quantity

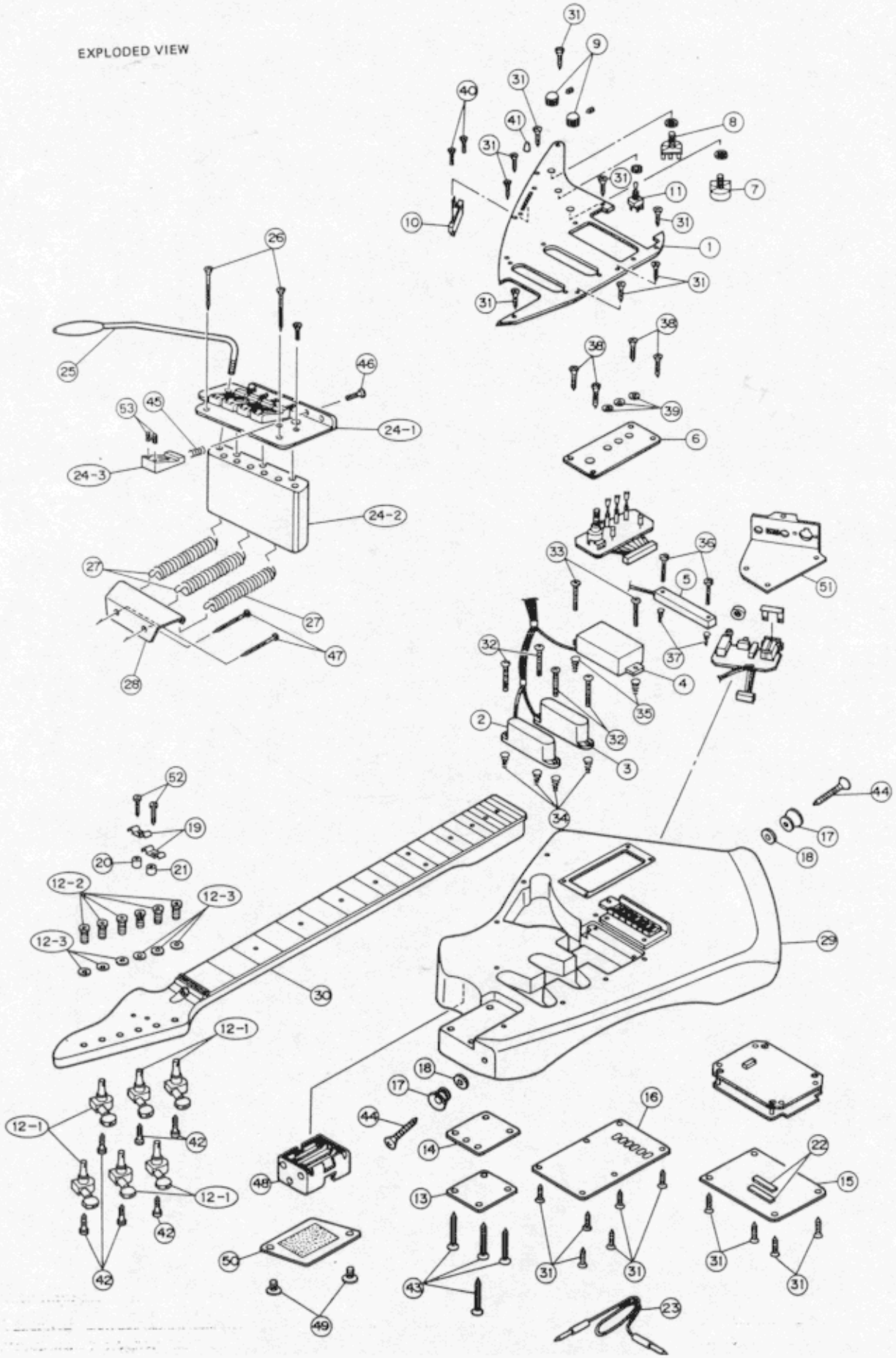
Rank A: Essential
B: Stock recommended
C: Others
X: No stock recommended

| Item | Code No. | Parts Name | Specification | Q'ty | * | Unit Price N.R. Yen (¥) (FOB: JAPAN) | RANK |
|---|---|---|---|---|---|---|---|
| ☆ 28 | 00077076 | Spring holder | Nickel | 1 | 5 | | C |
| ☆ 29 | 00077099 | Body | MG-500 Black | 1 | | | C |
| ☆ 29 | 00077100 | Body | MG-500 Red | 1 | | | C |
| ☆ 29 | 00077101 | Body | MG-500 White | 1 | | | C |
| ☆ 29 | 00077102 | Body | MG-510 Black | 1 | | | C |
| ☆ 29 | 00077103 | Body | MG-510 Red | 1 | | | C |
| ☆ 29 | 00077104 | Body | MG-510 White | 1 | | | C |
| ☆ 30 | 00077105 | Neck | MG-500 Black | 1 | | | C |
| ☆ 30 | 00077106 | Neck | MG-500 Red | 1 | | | C |
| ☆ 30 | 00077107 | Neck | MG-500 White | 1 | | | C |
| ☆ 30 | 00077108 | Neck | MG-510 | 1 | | | C |
| ☆ 31 | 00077077 | Round flush tapping screw | 3 x 12 mm, Black | 24 | 20 | | X |
| ☆ 32 | 00077078 | Round flush tapping screw (B-1) | 3 x 20, Black | 2 | 20 | | X |
| ☆ 33 | 00077079 | Pan-head tapping screw (B-1) | 3 x 25, Black | 2 | 20 | | X |
| ☆ 34 | 00077080 | MX-S fixing spring | BL-300, Nickel | 4 | 20 | | X |
| ☆ 35 | 00077081 | MX-H fixing spring | NP, Nickel | 2 | 20 | | X |
| ☆ 36 | 00077082 | Pan-head screw | 3 x 20, Black | 2 | 20 | | X |
| ☆ 37 | 00077083 | Spring | Semi-conical 8 mm, Nickel | 2 | 20 | | C |
| ☆ 38 | 00077084 | Flush-head tapping screw | 2.6 x 12 Black | 8 | 20 | | X |
| ☆ 39 | 00077085 | Snap washer | Black | 4 | 20 | | X |
| ☆ 40 | 00077086 | Round flush screw | 3 x 8, Black | 2 | 20 | | X |
| ☆ 41 | 00077087 | Select switch knob | Black | 1 | 10 | | X |
| ☆ 42 | 00077088 | Round-head wood screw | 2.4 x 10, Black | 6 | 20 | | X |
| ☆ 43 | 00077089 | Round flush tapping screw | 4.5 x 45, Black | 4 | 20 | | X |
| | 00077090 | Round flush tapping screw | 3 x 10, Black | 1 | 20 | | X |
| ☆ 44 | 00077091 | Round flush tapping screw | 3.5 x 25, Black | 2 | 20 | | X |
| ☆ 52 | 00077092 | Round-head wood screw | 2.1 x 13 | 2 | 20 | | X |
| ☆ 53 | 00077093 | Saddle height adjusting screw | 3 x 8, Black (for 1st and 6th Strings) | 4 | 20 | | X |
| ☆ 53 | 00077094 | Saddle height adjusting screw | 3 x 10, Black (for 2nd~5th Strings) | 8 | 20 | | X |
| ☆ 45 | 00077095 | Saddle tension spring (for 6th and 3rd strings) | 0.6 x 7, Black | 2 | 20 | | C |
| ☆ 45 | 00077096 | Saddle tension spring (for 1st,2nd,4th,and 5th strings) | 0.6 x 11, Black | 4 | 20 | | C |
| ☆ 46 | 00077097 | Round-head screw | 3 x 15, Black | 6 | 20 | | X |
| ☆ 47 | 00077098 | Round flush wood screw | 4.1 x 45, Nickel | 2 | 20 | | |

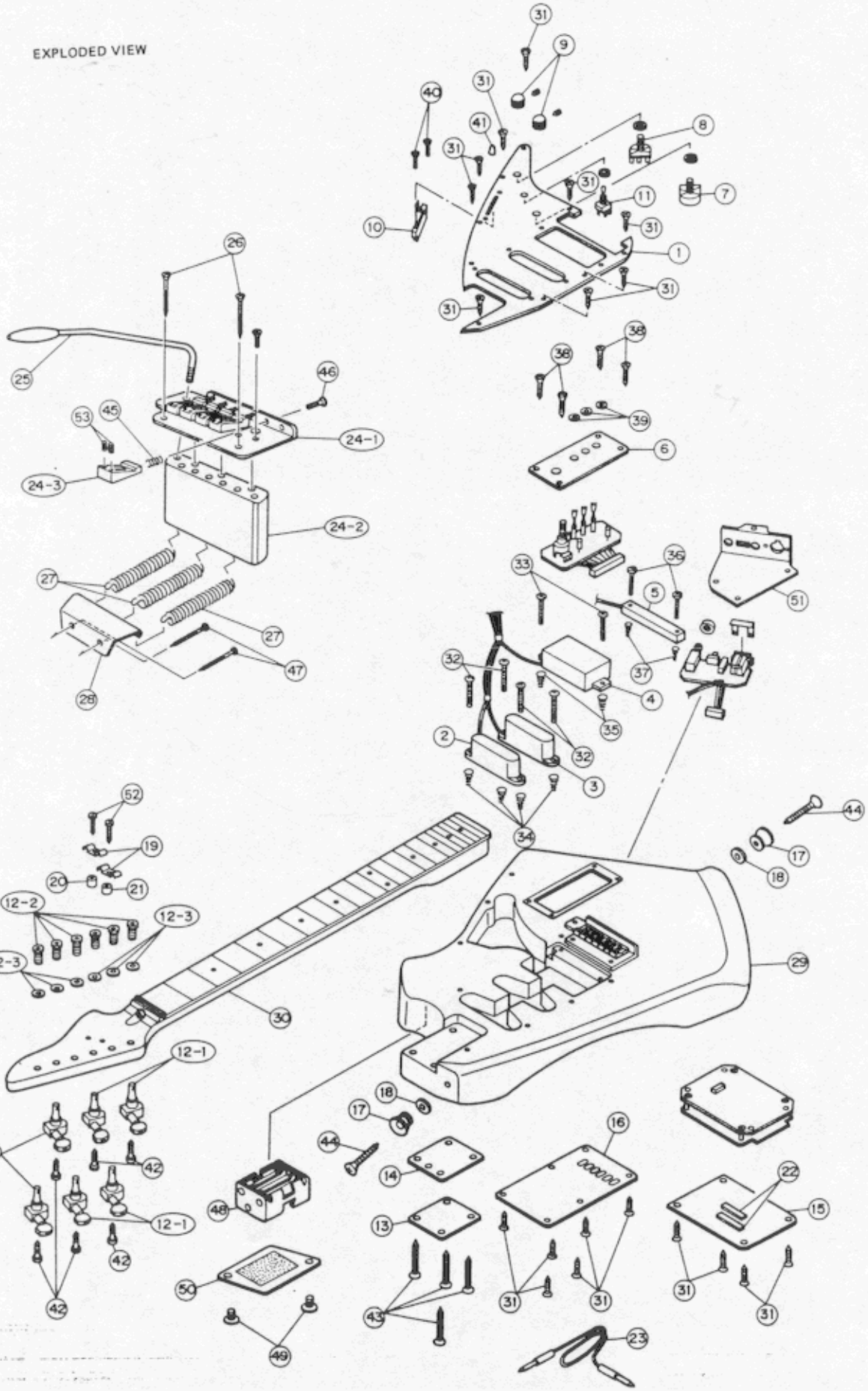
Note: ☆ – Newly employed parts
Q'ty – Quantity used per unit
* – Minimum order/supply quantity

Rank A: Essential
B: Stock recommended
C: Others
X: No stock recommended

EXPLODED VIEW



EXPLODED VIEW



# CASIO DIGITAL GUITAR

## Model MG-500/510 MIDI Implementation Chart Version : 1

| Function ... | | Transmitted | Recognized | Remarks |
|---|---|---|---|---|
| Basic | Default | 1 through 16 CH | × | Set using microswitches. |
| Channel | Changed | 1 through 16 CH | × | |
| | Default | Mode 3, 4 | × | Set using microswitches. |
| Mode | Messages | POLY, MONO (M = 6) | × | |
| | Altered | ********** | × | |
| Note Number: | True voice | 16 ~ 79(DOWN), 28 ~ 91 (NORMAL),40 ~ 103(UP) ********** | × | Octaved can be raised or lowered. |
| Velocity | Note ON | ○ 9n v = 1-127 | × | |
| | Note OFF | × 9n v = 0 | × | |
| After Touch | Key's | × | × | |
| | Ch's | × | | |
| Pitch Bender | | ○ | × | 8 bits effective |
| Control Change | 7 | ○ | × | MAIN VOLUME |
| Prog Change: | True # | ○ 0-95 ********** | × | |
| System Exclusive | | ○ | × | Bend range |
| System Common | : Song Pos | × | × | |
| | : Song Sel | × | × | |
| | : Tune | × | × | |
| System Real Time | : Clock | × | × | |
| | : Commands | × | × | |
| Aux | : Local ON/OFF | × | × | |
| | : All Notes OFF | × | × | |
| Mes- | : Active Sense | ○ | × | |
| sages | : Reset | × | × | |
| Remarks | | MIDI messages output at power ON. OMNI OFF, POLY ON/OFF (according to microswitch setting), PROGRAM CHANGE (PROGRAM No. 0), PITCH WHEEL CHANGE (center value), MAIN VOLUME (according to MIDI volume control position), BEND RANGE (exclusive). | | |

Mode 1 : OMNI ON, POLY
Mode 2 : OMNI ON, MONO
Mode 3 : OMNI OFF, POLY
Mode 4 : OMNI OFF, MONO

○ : Yes
× : No